CLAIMS

1. A method for reading an invisible symbol comprising the steps of:

heating an invisible symbol formed on a sample and containing a material which emits infrared light when heated;

detecting infrared light emitted from the invisible symbol;

calculating a differential coefficient of a detection signal corresponding to a position on the sample;

determining, on the basis of upper and lower threshold values set for the differential coefficient, a maximum value of the differential coefficient in a region exceeding the upper threshold value and a minimum value of the differential coefficient in a region smaller than the lower threshold value; and

binarizing the detection signal by using the maximum or minimum value as a leading or trailing edge of a binary function.

2. The method according to claim 1, wherein the step of detecting infrared light emitted from the invisible symbol is performed in a process of cooling the sample.

3. The method according to claim 1, wherein the invisible symbol is a linear barcode, a basic width of the linear barcode is calculated from the binary

function, and the binary function is corrected to an integral multiple of the basic width.

4. The method according to claim 1, wherein the invisible symbol is a linear barcode, a basic width of the linear barcode is calculated by detecting a reference code pattern, and a data character is read on the basis of the calculated basic width.

5. The method according to claim 1, wherein a signal level of an underlying substrate is used as a signal level of background to correct a signal level of the invisible symbol.

6. The method according to claim 1, wherein the invisible symbol is made from a polymer containing a cyano group.

7. The method according to claim 1, wherein the sample is heated to 60 to 100℃.

8. An apparatus for reading an invisible symbol comprising:

heating means for heating an invisible symbol formed on a sample and containing a material which emits infrared light when heated;

detecting means for detecting infrared light emitted from the invisible symbol; and

an arithmetic operation unit for binarizing a detection signal from said detecting means.

9. The apparatus according to claim 8, wherein said arithmetic operation unit calculates

a differential coefficient of the detection signal corresponding to a position on the sample, determines, on the basis of upper and lower threshold values set for the differential coefficient, a maximum value of the differential coefficient in a region exceeding the upper threshold value and a minimum value of the differential coefficient in a region smaller than the lower threshold value, and binarizes the detection signal by using the maximum or minimum value as a leading or trailing edge of a binary function.

10. The apparatus according to claim 8, wherein said heating means for heating the sample is installed in a position apart from said detecting means, and

said apparatus further comprises means for moving the sample from a heating position of said heating means to a detection position of said detecting means.

11. The apparatus according to claim 8, further comprising control means for turning off said heating means heating the sample before detection by said detecting means.

12. The apparatus according to claim 8, further comprising:

means for optically modulating the infrared light emitted from the invisible symbol; and

means for detecting a phase of the detection signal.

13. The apparatus according to claim 8, further

comprising a bandpass infrared filter for transmitting infrared light in a specific wavelength region of the infrared light emitted from the invisible symbol.

14. The apparatus according to claim 13, wherein said bandpass infrared filter transmits infrared light near 4.5 μm peculiar to a cyano group.

15. The apparatus according to claim 8, further comprising a calcium fluoride lens as condensing means.

16. The apparatus according to claim 8, further comprising a Cassegrain lens as condensing means.

17. The apparatus according to claim 8, wherein said detector is a mercury cadmium tellurium detector.

18. The apparatus according to claim 8, wherein said detector forms a focal plane array.

19. The apparatus according to claim 18, wherein an element constructing said focal plane array is made of a material selected from the group consisting of platinum silicide and indium antimony.